

Flame Detector

At Kennedy Space Center (KSC), NASA stores hydrogen fuel for the Space Shuttle in large spherical tanks and feeds it through a pipeline to the launch pads. The hydrogen must be handled with care; it is easily ignited and is particularly troublesome because it burns with an invisible flame.

As a safety aid for KSC personnel, Scientific Instruments, Inc., West Palm Beach, Florida, developed a device capable of detecting the ultraviolet emissions in a hydrogen flame. Later the company expanded the utility of the device by adapting it to detection of flames from hypergolic propellants (those that ignite on contact with an oxidizer) in ground tests of the Space Shuttle's orbital maneuvering system and reaction control system. Subsequently, the detector went into service with the Air Force to monitor hypergolic fuel storage tanks, and with the Navy for use in hyperbaric chambers where deep underwater dives are simulated.

Scientific Instruments has now developed a second generation, commercially available instrument to detect flames in hazardous environments, typically refineries, chemical plants and offshore drilling platforms. The Model 74000 UV Flame Detector is pictured in the foreground at left below, along with the Model 7410CP annunciator control panel. The latter is designed to enhance the detector's utility by making available a complete selectable fire detection and alarm system.

The Model 74000 detector incorporates a sensing circuit that detects UV radiation in a 100-degree conical field of view extending as far as 250 feet from the instrument (below). It operates in a bandwidth that makes it virtually "blind" to solar radiation while affording extremely high sensitivity to ultraviolet flame detection. A "windowing" technique accurately discriminates between background UV radiation and ultraviolet emitted from an actual flame—hence the user is assured of no false alarms.

The Model 7410CP is a combination controller and annunciator panel designed to monitor and control as many as 24 flame detectors. When it receives an alarm condition signal from the detector, the controller will automatically activate external fire extinguishing equipment or fire precautionary systems such as valves or door closing devices.

